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EDITORIAL

The Government Farm Fraser's Hill.

Prior to 1929, the supply of fresh vegetables and milk on Fraser's Hill was limited; the vegetables were supplied from a small area in the neighbourhood of "Red-Cross" Bungalow, and adjoining this area a dairy herd was maintained, but the supply of milk was inadequate and working conditions were unsatisfactory.

It was evident that conditions justified the establishment of a farm operating on a larger scale, which would not only cater for the residential area on the hill, but would also provide useful information as to the prospects of supplying some of the needs of this country in the matter of hill produce such as milk, vegetables, poultry, eggs, meat, flowers, and fruit of a type likely to be in demand in the local markets.

The proposal for the new farm was submitted to Government by the Director of Agriculture in 1929, and in 1931 an officer of the Department of Agriculture was stationed at Fraser's Hill. Importation of pure-bred cattle and poultry was commenced, and the farm, situated at Jeriau, about 2½ miles north of Red Cross bungalow, began operation.

A vegetable garden, designed primarily with the object of meeting requirements on the Hill, was established near the new dairy farm and by 1932 was functioning satisfactorily. Surplus supplies have been disposed of in Kuala Lumpur and neighbouring markets. It is considered that there is a potential market for fresh vegetables of good quality once marketing and transport can be organised more efficiently, and the experience gained by the Department of Agriculture, as a result of the efforts on the Fraser's Hill farm should be of value to enquirers interested in this branch of agriculture.

It is evident that the most satisfactory results are obtained when the majority of the produce is planted so as to avoid the bad effects of very wet weather. Damage to seedlings during heavy rains and the ravages of certain insect pests and diseases, maintaining the fertility of the soil and ensuring a suitable crop rotation are the principal, purely agricultural, difficulties to be overcome.

The farm is fortunate in having available large supplies of cattle manure, so that it has not been found necessary to use artificial fertilisers except for experimental purposes. In this connection, it may be mentioned that the farm

is situated at a sufficient distance from the residential area to ensure that flies will not become a nuisance in the bungalows.

The vegetables which have shown promising results include beetroot, cabbage, carrots, green-peas, beans, leeks, lettuce, radish, asparagus, and spinach. Fresh vegetables are collected daily and are retailed at the milk depot in the residential area.

A fruit nursery has also been started and in addition to limes, bananas and papayas, an introduced raspberry and three types of strawberries are now established.

The excellent quality of the milk produced from the herd of Friesan cows at the dairy farm is much appreciated by the visitors to Fraser's Hill. Yields of milk have so far not proved high, but it is hoped to effect an improvement in this direction now that the pasturage areas have become established and suitable fodder is available. The milk is produced under most careful sanitary conditions, and the milk bottling-room is equipped with modern dairy appliances including a steam plant for sterilisation of utensils and a bottle filling apparatus.

With regard to poultry, it is considered that experiments in poultry farming in the hill country are likely to repay investigation, but much work remains to be done, before definite advice on this question can be given with authority. Expert advice on matters relating to poultry farming has not been readily available in Malaya in the past, but it is hoped that the efforts now in progress and future work contemplated on the hills as well as on the plains will, as far as resources permit, effect an improvement in this direction.

The account of the preliminary work in relation to dairy and poultry farming and production of marketable produce from the Malayan highlands published in this issue will, it is hoped, stimulate interest in what is a comparatively new branch of agricultural endeavour in Malaya.

The Oil Content of Malayan Groundnuts.

In 1932, the net imports of groundnuts into Malaya amounted to 6,700 tons valued at $723,306 and of groundnut oil 9,265 tons valued at $2,195,486. The oil is used almost exclusively by the Chinese community as a cooking oil, and it seems evident that considerable scope exists for the extension of groundnut cultivation in Malaya, with the object of encouraging a local industry for the production of the oil.

During the Inter-Departmental Conference in Kuala Lumpur in 1932, it was decided that certain lines of work in connection with groundnuts should be pushed forward energetically, and in view of statements made locally that the oil content of Malayan groundnuts compares unfavourably with that of imported nuts, it was thought that an investigation of the question, by the Chemical Division of this Department, was desirable.

The results of the analyses, which are published in the article included in the present number, show that although the oil content of both local and imported kernels are of the same order, when calculated on a moisture-free basis, it is possible that, in some cases, a better recovery of oil is obtained from the imported kernels, which are dried before shipment, on account of their lower moisture content.

Manuring of Coconuts and Oil Palms.

In March and June 1932, preliminary observations relating to manurial experiments on these two crops were published in this Journal. In this number of the Journal, results of the experiments, to date, are described and it is shown that while large, commercially remunerative returns have been secured from the use of phosphatic fertilisers on oil palms, yielding moderately or poorly and growing on quartzite hill or organic soils, no general conclusions can as yet be drawn from the manuring experiments carried out on coconut palms. On one coconut estate, however, where initial yields were low, an increase due to cultivation combined with clean weeding was recorded.

An encouraging fact which emerges from the results obtained with oil palms, is that manuring of the lower yielding areas is likely to be economic even with palm oil at the low price of £16 per ton, and it is considered likely that if, as is probable, rock phosphates are found to be suitable, the cost of manuring may be reduced still further.

Village Fairs.

The article on village fairs which appears in this number of the Journal from the pen of Mr. L. D. Gammans, Assistant Director of Co-operation, provides an interesting discussion of a form of commercial activity which, as is pointed out in the article, exists in some form or another in almost all agricultural communities.

In efforts to broaden the economic basis of the country and to lessen dependence on imported foodstuffs the problem of disposing of increased quantities of locally produced commodities in competition with imported articles is not always easy of solution and as an aid to this end Village Fairs have a not inconsiderable potential importance.

In their simplest form such fairs are bartering grounds where one article is bartered for another. In slightly more complex form they constitute local trading centres where simple cash and credit transactions are carried out on a fixed day at regular intervals.

Born as they are of the exigencies of the moment their existence tends to be ephemeral; they have little permanence and their effectiveness waxes and wanes with the immediate circumstances prevailing in a locality; a slight change in economic conditions or in personnel may call one into existence or equally slight change terminate it.

It is plain that such fairs scattered over the country side can form useful local supplements to the large organised markets of the towns, and the possibility of encouraging them and at the same time imparting to them a degree of stability has engaged the attention of administrative, co-operative and agricultural officers for some time past. In the State of Kedah a Village Fair Committee has been lately appointed by the Government with the object of encouraging and supervising their organisation, and a scheme for small shows of produce in connection therewith has been devised.

Mr. Gammans gives details of a project for organising these fairs on a co-operative basis which has much to commend it. If, as Mr. Gammans suggests, the practice can be established of registering and operating these fairs as co-operative units and at the same time providing simple banking facilities in connection therewith, a notable step forward will have been achieved. Progress in connection with the movement will be watched with considerable interest.

THE GOVERNMENT FARM, FRASER'S HILL.

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Introductory.

The proposal to establish a dairy farm at Jeriau, Fraser's Hill, Pahang, originated as a result of a report submitted to Government by the Director of Agriculture dated 17th of August, 1929.

For some years a small dairy herd was maintained on the hill, in temporary wooden buildings, but the supply of milk was inadequate and working conditions unsatisfactory. It was considered advisable to select a site removed from the residential area, where a larger farm might be laid out on modern lines with sufficient space available for the necessary buildings, grazing paddocks, and pasturage. In addition, sites for a small poultry farm, vegetable and fruit areas, were envisaged.

The new farm commenced operations during the middle of 1931, when a herd of twenty-six Friesian cattle was imported from South Africa. At the same time a consignment of pure-bred fowls comprising the following breeds was received :—Rhode Island Red, Light Sussex and White Leghorns. Earlier in the year an officer of the Department was stationed at Fraser's Hill, preparatory to taking over the work of the farm when stock arrived. A new vegetable garden was opened at Jeriau, on land adjoining the dairy farm, with the object of ensuring an ample supply of fresh vegetables to meet the requirements of the hill station.

Although certain difficulties have been encountered, with close attention to detail these have been overcome. It is considered that the progress of the farm and vegetable garden for the year 1932, has been very satisfactory, particularly in respect of the latter half when large supplies of produce became available and were readily disposed of.

It is proposed, therefore, to publish a brief account of the farm and its activities to-date.

Situation and Climate.

The farm is situated about 2½ miles north-west of Red Cross House, at an elevation of 3,200 feet above sea-level. A jungle path connects the farm with the station at Fraser's Hill, which is approximately 1,000 feet higher than the farm.

The area felled and cleared, consists of hilly land with a clear stream of water, known as Sungei Jeriau, flowing through the valley. A considerable amount of soil levelling was necessary to secure a sufficient area for the farm buildings.

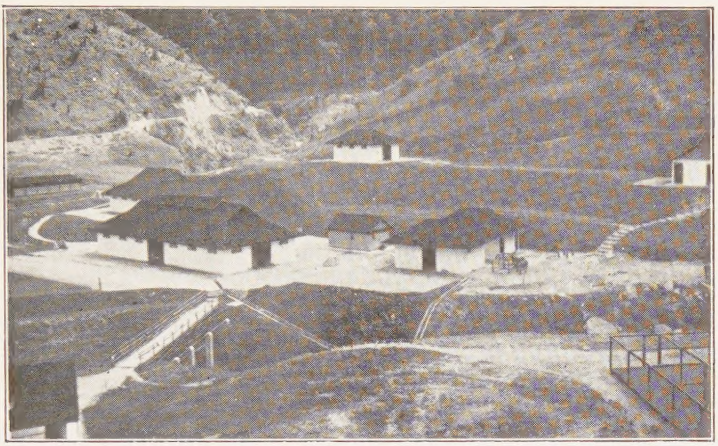
Meteorological observations are so-far not recorded at the farm but those for Fraser's Hill may be taken as a guide. During 1932, rain fell on 238 days, giving a total rainfall of 114.94 inches. The driest month was July with a precipitation of 3.45 inches, and the wettest month was November with 15.52 inches. The mean maximum temperature was 72.3°F, the highest maximum was 79°F; the mean minimum was 61.9°F; and the lowest 55°F. The total sunshine recorded for the year was 1,738.30 hours, which gives an average of 4.76 hours sunshine per day. The farm at Jeriau, in addition to being lower than Fraser's Hill is considerably more sheltered.

An important advantage of the site selected is an adequate supply of pure stream water and accessibility to the residential area at Fraser's Hill. The risk of nuisance from flies was obviated by establishing the farm sufficiently distant from the bungalows.

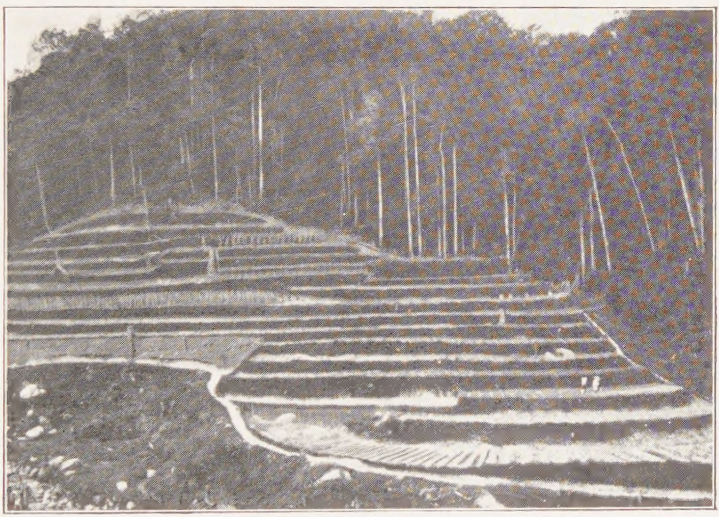
Dairy Farm.

Permanent farm buildings, erected by the Public Works Department, including equipment and the installation of a water supply, were completed by July 1931. The buildings now in use are as follows:—byre for 32 cows, calf-pen, calving stable, bull stable, mule stable, isolation stable, food store, litter shed, dipping tank, and quarters for Farm Overseer, cattle attendants and coolies. Adjoining the main byre are separate rooms for the following purposes:—food mixing room, milk room, office, tool store and boiler house. Owing to the fact that granite was available, local stone was largely used in the construction of the farm buildings and paving the yards. The buildings and lay-out of the farm have been designed on modern lines, and represent approved ideas in dairy practice.

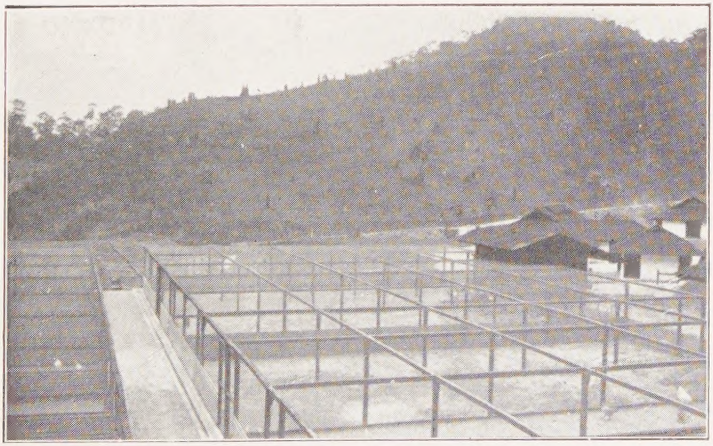
As already mentioned, the herd of pure-bred Friesian cattle was imported from South Africa. A pure-bred bull and twenty-five in-calf heifers arrived at Singapore from Durban in June 1931, through the agency of the Union of South Africa. The animals were quarantined for a period of two weeks at Fraser's Hill, and after inspection by the Government Veterinary Surgeon, Pahang, were transferred to the new farm. The animals arrived in good order and have proved well suited to conditions obtaining at Jeriau. In addition, a



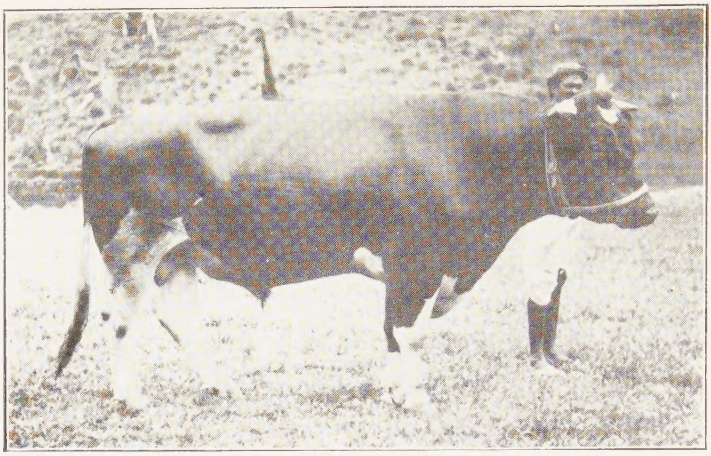
The Dairy Farm.



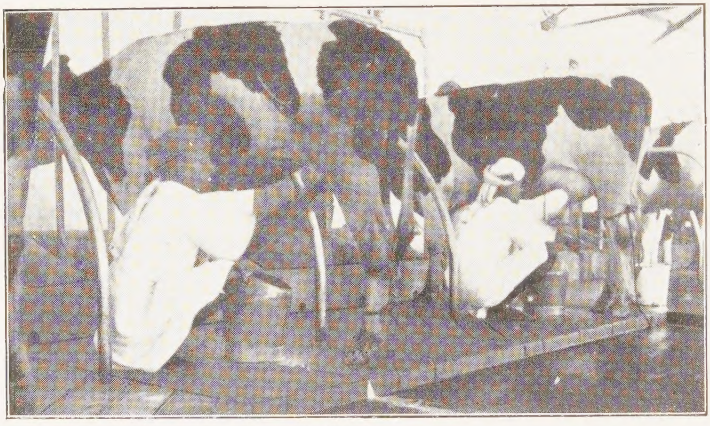
Vegetable Area.



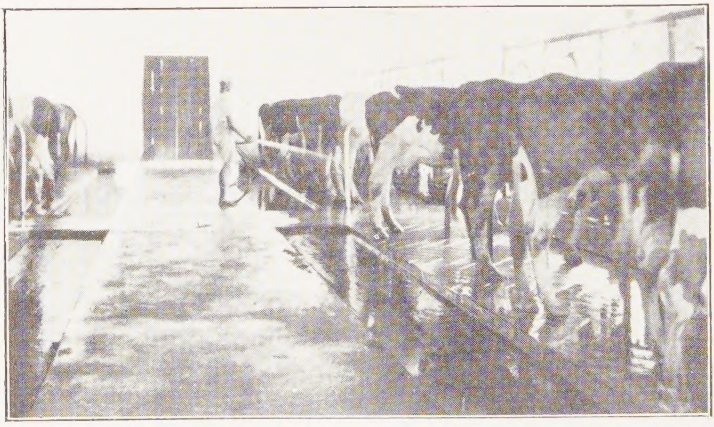
Poultry Runs.



The Friesian Bull.



Milking.



The Cow Byre.

number of Jersey cows and Jersey/Native half-bred heifers were taken over from the old farm formerly controlled by the Public Works Department.

At the close of the year 1932 the herd comprised the following stock :—

Breed.	Milch Cows.	Bull.	Heifer Calves.	Bull Calves.
Friesian ...	25	1	3	2
Jersey ...	4	—	1	1
Friesian/Jersey ...	—	—	1	—
Cross-bred ...	1	—	—	—
Totals ...	30	1	5	3

The young Jersey bull calf is being retained for stud purposes. Some thirty head of cattle were disposed of during the year 1932 including pure-bred Friesian calves born at Jeriau. A number of the latter were distributed for breeding purposes to various parts of Malaya. Eleven Friesian calves were purchased by a settler at Cameron Highlands.

Considerable attention has been given to the question of feeding the stock with the result that an economical and well balanced ration is now being employed. Details are as follows :—

Rations fed to stock at Jeriau Farm.

(*a*) Cows.

Maintenance Ration.

Rice bran	...	4 lbs.
Bengal gram	...	1 lb.
Maize	...	½ ,,
Coconut cake	...	½ ,,
		6 lbs. concentrates.

Production Ration.

For each gallon of milk add :

Gingelly cake	...	3 lbs.
Bengal gram	...	½ lb.

The animals have free access to mineral salt licks fixed in the stalls.

(*b*) Stud Bull.

Rice bran	...	4 lbs.
Bengal gram	...	1 lb.
Maize meal	...	½ ,,
Coconut cake	...	½ ,,
		6 lbs. concentrates.

A ration of 35 lbs. freshly cut grass is fed to the cows and stud bull daily.

Steps have been taken to feed calves with a ration as economical as possible. For this purpose separated milk, with the addition of 2½ per cent. palm oil produced locally has been utilized. The condition of the calves has shown steady progress since this mixture has been fed.

The following is a complete ration programme for calves :—

(*c*) Calves.

1 to 3 months old	—	milk 3 quarts.
3 months onwards	—	separated milk to which 2½ per cent. of palm oil is added. Rice bran 3 parts, Bengal gram 1 part, coconut cake 1 part.

2½ lbs. of this mixture per calf up to 2 years,

3 lbs. of this mixture per calf from 2 to 3 years.

Grass is fed as required from 3 months onwards.

As European cattle are very liable to contract Red-water fever (*Piroplasmosis*) special attention is given to periodical spraying with cattle dips and the careful removal of ticks.

Milk yields of the Friesian herd have so far not proved high. Since the pasturage areas have become established every effort is made to provide the milking cows with sufficient supply of fodder to increase the milk yield.

The following figures show the records of milk yields of six Friesian cows in the dairy herd :—

Cow No.	Duration of Lactation Period.	Yield of Milk.
2	311 days	3,218 Imperial pints.
3	302 ,,	3,329 ,, ,,
4	447 ,,	4,766 ,, ,,
11	260 ,,	3,537 ,, ,,
12	315 ,,	3,687 ,, ,,
24	450 ,,	6,843 ,, ,,

Gerber tests, to ascertain the percentage of butter fat of the milk produced by the herd are undertaken weekly. The average figure for the year 1932 was 4.3 per cent. butter fat.

The principal grass used for stall feeding purposes is Guinea grass (*Panicum maximum*). This grass has thrived exceedingly well on the slopes in the vicinity of the farm. Owing to intensive cutting, it is considered advisable to apply a dressing of manure at least once a year to ensure a high yield of suitable fodder. The following dressing of artificial fertilizers has been applied with satisfactory results :—2 cwt. Calcium cyanamide, 4 cwt. Basic slag, ¼ cwt. sulphate of Potash, per acre.

In addition, trials are being undertaken with the following grasses :— Kikuyu grass (*Pennisetum clandestinum*), Napier grass (*Pennisetum purpureum*) and *Stenotaphrum secundatum*.

The cows are milked at 4.30 a.m. and 12.30 p.m. The byre is thoroughly cleansed daily and all utensils are sterilized by steam immediately after milking. The milk room adjoins the byre and is equipped with modern dairy appliances including a milk cooler and cream separator. Every consideration is given to production of Grade A milk.

Two samples of milk from the herd, examined during March 1933, were reported upon as follows :—

Sample A.	24 Hrs.	48 Hrs.
Number of organisms per c.cm. developing on Agar at 37° C.	250	900
"*B. Coli*" present in	1 cc.	1 cc.
"*B. Coli*" absent from	1/10 cc.	1/10 cc.

Sample B.	24 Hrs.	48 Hrs.
Number of organisms per c.cm. developing on Agar at 37° C.	500	1,200
"*B. Coli*" present in	1 cc.	1 cc.
"*B. Coli*" absent from	1/10 cc.	1/10 cc.

A small quantity of cream is separated, when sufficient milk is available, and finds a ready sale. Dairy produce is transported by mules from the farm to the milk depot at Fraser's Hill, where it is sold to visitors or servants from the various bungalows. A steam plant for the sterilization of utensils, including milk bottles and cream cartons, is installed at the milk depot. A bottle filling apparatus is used to obviate contamination when handling the milk.

Poultry Farm.

The poultry farm comprises a flock of 30 pure-bred Rhode Island Red and 12 Light Sussex fowls. In addition there are 8 White Leghorns, 3 White Wyandottes, 12 cross-bred and 8 local fowls. The birds are housed in a series of four breeding pens and five laying pens; a further five poultry runs have been recently constructed for housing young stock. All birds are quarantined before being admitted to the farm as a precaution against contagious disease.

A wet mash is fed in the morning consisting of a ground mixture of 4 parts wheat, 2 parts maize, and 1 part whale meal not exceeding 4 ozs. per bird. Whole grain is fed at night. Green food such as cabbage and lettuce tops is provided and an adequate supply of ground oyster shell and fresh water is always available.

At the present time the output of eggs is insufficient to meet the demand from visitors to the hill, but every endeavour is being made to increase the egg-laying flock. Two incubators are now in use for this purpose. Settings of eggs are sold to applicants when available, but since the policy of the farm is to supply the requirements of visitors on the hill it has so far not been found possible to extend this branch of activity to any considerable extent. There is evidence however that poultry farming at such an altitude offers many possibilities for advancement in this country, but it is quite clear that further investigations are necessary before success in this direction may be attained. With regard to the actual weight of eggs laid by the various breeds, the White Leghorn has proved the most satisfactory, giving eggs averaging 2 ozs. in weight. Rhode Islands Reds are next in size with eggs weighing from $1\frac{1}{2}$ to $1\frac{3}{4}$ ozs.

Vegetable Garden.

The object of the vegetable garden at Jeriau is the production of fresh vegetables for consumption by visitors to the hill. Since, however, the demand fluctuates from time to time, surplus vegetables are disposed of in Kuala Lumpur and elsewhere. There is undoubtedly a large potential market for fresh vegetables of good quality, and it is considered that the experience gained to-date will be of value to those interested in this branch of horticulture.

With regard to the actual altitude at Jeriau (3,200 feet), it appears from information so-far available to be a very suitable elevation for the production of European vegetables. Whilst the temperature is sufficiently low to suit the requirements of the majority of such vegetables, growth is comparatively rapid, resulting in the production of large crops of good quality.

The Assistants Chemist, Soils Division, comments as follows regarding the soil at Fraser's Hill :—

> "The soils of the area are best described as sandy clay granites having a clay content of about thirty per cent. with the majority of the balance made up of coarse sand and gravel. They should drain fairly readily with such a texture.

They are generally speaking very poor, due in large measure to the high percentage of sand. Chemical analysis shows them to be of an average composition so that it may be assumed that the poorness is also due, to some extent, to the fact that its constituents are not broken down into an available form".

The site of the vegetable garden is situated on a moderately steep slope which permits of terracing throughout the whole of the area. Excellent drainage is obtained in such a situation. To save the considerable amount of labour involved in carrying water from the stream, a system of pipe supply has been installed. This was undertaken at a small cost owing to it being possible to dam a stream at a short distance away in an adjoining ravine. It must be emphasised that, since the most satisfactory results are obtained from vegetables during dry weather, a convenient supply of water is essential, otherwise labour costs are high.

For the purpose of maintaining the terraces in proper order and preventing slips during wet weather all banks are planted with Carpet grass (*Axonopus compressus*). This grass has an excellent binding effect on the soil and may be kept in check without excessive labour.

It is not possible in this article to record in detail the procedure necessary to raise from seed, transplant where necessary and cultivate the various vegetables in use. The principal difficulties encountered are high rainfall during certain periods of the year necessitating protection of seedling plants, insect pests, maintaining the fertility of the soil and ensuring a suitable crop rotation .

Owing to large supplies of cattle manure being available from the dairy farm it has not been found necessary to use artificial fertilizers.

The following manurial programme is proposed as a general guide:

Manure.	Period of application.	Quantity.	Area.
Cattle or other well rotted humus ...	alternate years	50 lbs.	100 sq. feet.
Artificial fertilizers ...	yearly	1 - 2 lbs.	- do -
Air-slaked burnt lime ...	alternate years	5 lbs.	- do -

It may be noted that by the use of basic fertilizers *e.g.,* Calcium cyanamide and Basic slag the addition of further supply of lime is unnecessary.

With regard to the actual manurial requirement, the common types of vegetables may be conveniently grouped as shown below.

Group.	Crop.	Manure.
A	Beans, peas, potatoes	Phosphoric acid and Potash
B	Cabbage and other leaf crops	Nitrogen and Phosphoric acid
C	Beet, carrot, parsnip, radish and other root crops	Nitrogen and Potash
D	Onion, leek, turnip, celery	Nitrogen, Phosphoric acid and Potash

In the absence of adequate supplies of cattle manure, or on land which has become highly acid by continuous applications of organic manure, the following programme of manuring is suggested for general use :—

Group.	Fertilizer.	Quantity per acre.
A	Rock phosphate Sulphate of potash	4½ cwts. 2½ „
B	Calcium cyanamide Rock phosphate	4 cwts. 3 „
C	Calcium cyanamide Sulphate of potash	5 cwts. 2 „
D	Calcium cyanamide Rock phosphate Sulphate of potash	3½ cwts. 2½ „ 1 „

Owing to the short period during which vegetables have been growing at Jeriau it is as yet too early to differentiate as to the most suitable varieties for cultivation.

The following table records results of the more important vegetables that have been grown with success. A standard area of land of 100 sq. feet is taken for each crop for recording purposes. In calculating returns for larger areas a reduction in crop of 15 to 20 per cent. must be allowed on account of paths between the beds.

Vegetable.	Period of growth.	Yield per 100 square feet. lbs.
Beetroot ...	3 months	64
Cabbage ...	14 weeks	60
Carrot ...	3 months	58
Cucumber	10 weeks	70
French Bean ...	10 „	35
Green Pea ...	12 „	15
Kale ...	10 „	40
Leek ...	5 months	25
Lettuce ...	10 weeks	42
Potato ...	3—4 months	28
Radish ...	1 month	20
Tomato ...	14 weeks	76

Other vegetables that show promising results are asparagus, lima bean, khol rabi and spinach.

Inter-cropping is undertaken where possible; by this means two crops of different maturation periods occupy the land. Fresh vegetables are collected daily and transported to the milk depot for sale to visitors. Any surplus available is despatched to Kuala Lumpur.

Fruit Area.

Steady progress has been made in the opening up of a small area north-east of the vegetable garden for the purpose of growing fruit. Limes, bananas and papayas have been established. An introduced raspberry (*Rubus lasiocarpus*) thrives exceedingly well and gives reason to expect that other fruits of this genus might be cultivated with success. In the vegetable area, three types

of strawberries are being grown *e.g.* Royal Sovereign, raised from English seed; a variety introduced from the Philippine Islands, and a variety from Hakgala, Ceylon. Two beds of the Philippine strawberry provided large crops of fruit, during the latter part of the year, which were readily saleable. After fruiting, it is necessary to cut the plants back to within an inch or so of the crown. Rhubarb is also very successful, plants being easily raised from imported seed, and crops throughout the year.

In conclusion it may be stated that there is considerable scope for further investigation as to suitable vegetables, fruits and flowers for this altitude. Owing however to strict economy, experiments in this direction are not at present possible since the farm and gardens are run as a commercial undertaking.

MANURIAL EXPERIMENTS ON COCONUTS AND OIL PALMS.

BY

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A. Coconuts.

In this Journal for March 1932 (page 105) an account was given of the lay-out and conduct of standardised experiments on the manuring of coconuts carried out by the Department of Agriculture on seven estates with the co-operation of the managers. Briefly, on each estate there are four experimental blocks of 64 palms divided each into four plots of 16 palms. Half of the plots are under a cover-crop or grass and half are bare. The vegetation on one of the covered plots in each block is slashed every three months and allowed to lie on the surface, on the other it is turned in to a depth of 7 inches every six months; one of the bare plots in each block is cultivated to a depth of 7 inches every year and the other is left undisturbed except for weeding operations. Each plot is further sub-divided into four plots of four trees each to which are applied (*a*) a complete mixture (NPK); (*b*) lime (L); (*c*) lime and a complete mixture (L.NPK); and (*d*) nothing (Control—C). Undue borrowing of manures by straying roots is avoided by drains and guard rows. There has been insufficient response to manuring to test the efficacy of these precautions for coconuts, but they have been proved to be efficacious in the case of oil palms with root systems at least as extensive.

The fertiliser mixture employed is as follows:—

Whale Guano Compound	...	2½ lbs. per tree.
Steamed Bone Meal	...	4 „ „ „
Muriate of Potash	...	1½ „ „ „

This mixture supplies Nitrogen 12, Phosphoric acid (P_2O_5) 44 and Potash 36 lbs. per acre.

Lime was applied at the rate of 10 piculs (approximately 12 cwts.) per acre.

Type of soil, age and other particulars of the trees employed are given in Table B. Three applications of manures and lime have been made on Estate A in August of 1930, 1931 and 1932, and two applications in all other cases in the first quarters of 1931 and 1932.

As nuts take approximately twelve months to mature it was not expected that any effect of manures or surface treatments would be exhibited during the first year. Records for this period however should be useful as uniformity trials. Means obtained from these records are given in Table C.

Inspection of these figures show that uniformity is satisfactory with the possible exception of Estate "B", as far as mean yields are concerned; turning to the figures given in Table A which show the minimum percentage differences which can be regarded with some certainty as due to the treatment or manure employed and not to chance, it is seen that increases large enough to be economic should be discovered for "treatments" on Estates A, D and E, and for manures on Estates A, D and G. Owing to relatively large inherent variation on Estates B, F and G, "treatments" in these cases would need to cause large differences of yield if reliance is to be placed on one year's results; when several years' yields are available the error should materially be reduced.

Mean yields for 1932, when manures and treatments may be presumed to have had opportunities of influencing harvest, are given in Table D.

The only changes of any magnitude are to be found in Estates B, D and F, and only these results have been statistically analysed.

Results of statistical analysis for 1932 are :—

		Minimum Difference for Significance between any Pair of 'Treatments'	Minimum Increase over Control for Significance
		per cent.	per cent.
Estate B	...	31.4	28.8
D	...	16.9	15.0
F	...	29.8	16.7

From this it follows that while no manurial increase is "significant", the result of cultivation with clean weeding has been definitely better than any other treatment on Estate B, and better than slashing of cover on Estate D; the same treatment just misses significance on Estate F*.

A further test of the results may be made by taking into account the 1931 results and considering the changes from 1931 to 1932. If this is done there is enhancement of the difference between cultivation of bare surface and cover buried on Estate F and of increase of manured over control plots on Estate B. Analysis by Sanders' method of co-variance shows the former to be just significant while the latter is not, due mainly to the enormous variation in 1931 on that Estate.

All records discussed above are of numbers of nuts, it is of course realised that manures or treatments may act also by increasing nut size or copra content.

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* The "Z" values confirm these deductions.

The actual preparation of copra from a small number of nuts from a large number of plots presents great difficulties, but the Assistant Chemist for Copra Research (Mr. F. C .Cooke) has shown that there is a remarkably close relationship between weight of husked nut and meat content; determinations of weights of husked nuts have been made once in 1932 and will be repeated half-yearly. So far no economic or significant differences of nut size have emerged.

Conclusions.

Experimental error, although large, is generally within the limits required for the testing of the large increases which would be necessary for manuring to be economic.

The one outstanding fact of the experiments has been the increase due to cultivation on Estate B, where initial yields were low; apart from this no general conclusions can be drawn nor advice for manuring given from results up to the end of 1932.

Records will be taken during 1933 and treatments continued but no manures or lime will be applied, since it is possible that results may appear later.

TABLE A.

	Minimum difference between any pair of "treatments" required for significance, per cent.	Minimum increase over control required for significance in the in the case of manures, per cent.
A	17.0	12.8
B	64.0	49.0
D	19.6	9.1
E	18.9	10.7
F	31.6	16.9
G	46.5	18.5

Table B.

Estate	Locality	Age of palms at commencement of experiment	Type of soil	Treatment before experiment started	Type of cover employed in experiment
A	Banting	21 years	Alluvial clay loam	Clean weeded	Grass and weeds
B	Province Wellesley —North	Unknown, very old	Sandy soil over white silt	Under grass	Grass
C	Province Wellesley —South	20 years	Heavy clay	Under *Centrosema pubescens* and grass ploughed in at intervals	*Centrosema* and grass
D	Krian District	20 years	Friable clay loam	Clean weeded	*Centrosema* and *Mikania scandens*
E	Bagan Datoh	20 years	Heavy clay	Grass, *Centrosema* and Fern	Grass, *Centrosema* and Fern
F	Sabak Bernam	17 years	Very heavy clay	Leguminous cover and weeds. Block 4 *Centrosema* and Grass	Grass and leguminous covers Blocks 1—3, *Centrosema* in Block 4.
G	Sepang	10—11 years	Peat overlying heavy clay	3 Blocks under weeds and fern. 1 Block under *Mikania scandens*	3 Blocks under weeds and fern. 1 Block under *Mikania scandens*

TABLE C.

Mean Results for First Year.

Estate	Period	Yield of nuts per tree	Surface Treatments				Manures			
			Cover slashed	Cover buried	Clean cultivated	Clean not cultivated	NPK	NPK Lime	Lime	Control
			As percentages of general mean				As percentages of general mean			
A	July 1930 to June 1931	57.00	95.7	105.2	103.9	95.3	101.9	103.4	91.0	106.3
B	1931	15.75	87.2	118.2	97.7	96.9	86.6	98.1	87.7	127.6
C*	—	—	—	—	—	—	—	—	—	—
D	1931	76.00	93.2	105.2	101.3	100.1	96.4	99.5	98.5	105.5
E	„	80.75	103.6	97.6	101.1	98.1	97.4	104.0	96.7	101.0
F	„	51.75	99.4	106.5	96.1	98.0	101.5	92.6	102.2	103.7
G	„	50.75	103.5	100.2	96.1	102.3	101.5	99.6	103.3	96.5

*Yields from Estate C were not available for twelve months.

TABLE D.

Mean Results for 1932.

Estate	Mean yield of nuts per tree	Surface Treatments				Manures			
		Cover slashed	Cover buried	Clean cultivated	Clean not cultivated	NPK	LNPK	Lime	Control
		As percentages of general mean				As percentages of general mean			
A	46.62	95.5	99.3	102.1	103.2	92.0	104.0	102.3	101.7
B	22.37	86.5	87.1	132.8	93.7	96.7	111.3	91.4	100.5
C	88.73	92.3	98.0	103.5	106.2	104.2	92.4	101.4	102.0
D	65.19	84.9	101.1	113.5	100.5	89.6	99.3	104.0	107.0
E	64.69	100.1	100.6	102.4	96.8	98.2	99.0	93.1	109.7
F	45.85	98.7	88.5	117.5	95.3	96.8	102.2	106.8	94.2
G	55.22	96.9	109.8	99.7	93.6	96.5	101.0	100.6	101.9

B. Oil Palms.

In this Journal for March (page 110) and June (page 304) 1932, accounts were given of the lay-out and yield records of standardised manurial experiments on oil palms.

On two estates and at the Government Experimental Plantation, Serdang, preliminary records for ½—1½ years have been taken and manures applied to plots of 10 trees each of oil palms in bearing.

At Serdang, there are three replications of each treatment arranged in three blocks, and on the estates five or six replications arranged in two blocks.

Manures have been applied twice yearly and from July 1930 to July 1931 consisted of :—

Sulphate of ammonia (20 per cent. N) at the rate of 1 lb. per palm per annum "N".

Superphosphate (18—20 per cent. P_2O_5) at the rate of 4 lbs per palm per annum "P".

Sulphate of potash (48 per cent. K_2O) at the rate of 1 lb per palm per annum "K".

Sulphate of magnesia (16 per cent. MgO) at the rate of 1½ lbs. per palm per annum "Mg".

These substances have been applied alone or in combination to give mixtures designated later as NPK, PK, PK Mg, etc. In one experiment lime was applied to two plots ,but gave no perceptible increases.

In 1932 basic slag was substituted for superphosphate.

Owing to the presence of supplies not yet in bearing on certain of the plots, it has been necessary to express yields per mature tree and not per plot.

Results in pounds of fruit bunch per mature tree are given in Table E. From these figures it will be seen that the addition of magnesia has had no material effect, accordingly, in Table F where results are expressed as percentages of the general mean for each year, the results for each manurial treatment with addition of magnesia have been merged into those for the same treatment without magnesia.

It was originally intended to have 20-tree plots but yield records (fortunately taken for individual trees) showed that the experimental error due to inherent variation of the palms was so great that 20-tree plots would give an insufficient number of replications for the desired degree of accuracy. Before the first application of manures in 1930 the 20-tree plots were divided into 10-tree plots with a guard-tree between, an extra tree being taken into every other plot. For this reason, yields in 1929 and the first half of 1930 are not exactly comparable with those of subsequent years, but for practical purposes comparison may be made since all that has happened is the substitution of one tree out of ten in half the plots comprising any given treatment and the differences found as a result of manuring transcend any error which could arise as a result of this substitution.

One of the Blocks on Estate B was taken into the experiment in July 1930, hence no 1929 yields are given for this Estate.

There were two other experimental blocks on Estate B on sandy quartzite soil, unfortunately one suffered somewhat severely from disease and the results (which show a decided increase following manuring) cannot be accepted as sufficiently reliable. The other block (three replications) has given the following results in pounds per tree :—

		1931	1932
NPK	...	195	196
PK	...	168	195
P	...	170	178
Control	...	175	197

It is clear that in view of the small number of replications, none of these differences have significance; the fact that such differences as exist are far smaller-than those on the other experimental areas may be due to the fact that the field in which these plots are situated received a dressing of local phosphate at the rate of approximately half a ton per acre, some years ago.

Unfortunately the Serdang results suffer from the presence in each treatment of one low-yielding plot in which the trees are becoming progressively worse, due most probably to the approach to the surface of the sub-soil, a very fine compact white sand. As a result, experimental error is great and increasing. It the poorest plot is omitted from each treatment, leaving two replications only, mean yields become in pounds per palm :

		NPK	PK	P	Control
1929	...	228	195	233	208
1930	...	175	218	202	195
1931	...	233	290	233	207
1932	...	279	293	249	232

and still no significant increases are shown.

This experiment was extended in 1932 by duplicating the existing blocks but the extension has not been sufficiently long in operation to render the results of value.

Taking the stand of 55 trees per acre and conventional factors of 60 per cent. of weight of bunch as stripped fruit and 25 per cent. of stripped fruit as oil, it appears that control yields, taking the means of 1931 and 1932 of oil in pounds per acre per annum, were approximately Serdang 1550, Estate A 1440, Estate B 872. Preliminary records of 1929 and 1930 show that the manured plots were not of inherently greater yield capacity than the control, but rather the reverse, except in the case of the NPK plots of Estate B, so that every confidence may be placed in the results of the statistical analysis which shows that real gains have resulted from manuring with phosphate manures on Estates A and B, while no further increases have resulted from addition of potash, nitrogen or magnesia.

The lack of response at Serdang may be due to soil peculiarities, or the fact that with a given type of palm a natural yield of say 1500 lbs. of oil at 10—12 years cannot be increased by manuring.

On the commercial side, manuring has been successful on Estates A and B. Taking the application as 1½ cwts. of superphosphate or basic slag per acre at $3/- per cwt. and allowing for cost of application, the return, excluding harvesting, manufacture and handling, with oil at £ 16 per ton, would be approximately £4 per acre for Estate A and £6.10.0 per acre on Estate B; as stated in Table E the experimental areas on the former Estate are on undulating quartzite soil and on the latter on organic (commonly known as "peaty") soil.

The cost of manure may be further reduced if rock phosphates prove suitable and judging from the results of pot culture experiments with other crops, such as maize or gingelly, there is every reason to suppose that they will prove suitable. A new experiment has been started at Serdang on soil similar to that of Estate A, to compare rock phosphate with basic slag.

In view of the fact that response has not been obtained at Serdang nor on the relatively high yielding area on Estate B which had been previously manured, manuring can only definitely be recommended on organic or quartzite hill or undulating soils for areas yielding less than—say—1300 lbs. of oil per acre at 10—12 years. On other soils and on higher yielding areas, it is recommended that simple experiments be conducted on—say—two or three, 5 or 10 acre blocks using the remainder of the field or fields as control. Records should be taken for six months before manuring.

In order to ascertain the frequency with which applications must be made it is proposed to withhold manures during 1933 but to continue records.

Summary.

An account is given of manuring experiments on oil palms in bearing.

It is shown that large and commercially remunerative returns have been secured from the use of phosphatic fertilisers, on palms of medium or poor yield, on quartzite hill and on organic soils.

A warning is given that good yielding areas may not respond to manuring and simple experiments are suggested before large scale manuring is undertaken.

The authors desire to express their thanks to the Managers and Agents of the coconut and oil palm Estates, on which experiments have been conducted, for their assistance, and to Mr. B. Bunting, Agriculturist, for much help and valuable criticism.

Table E.

Mean Yield in Pounds of Fruit in Bunch per Mature Tree*

SERDANG. Quartzite Valley Soil. Palms Planted November 1924.

	No. of Mature Trees	1929	1930	1931	1932
NPK ...	30	195	146	179	224
PK ...	30	185	191	237	235
P ...	30	209	177	182	195
Control ...	30	187	170	158	204
Mean of all Plots ...		194.0	171.0	189.0	214.5

ESTATE A. Quartzite Hill Soil. Palms Planted 1922.

	No. of Mature Trees	1929	1930	1931	1932
NPK ...	36	100)) 101	144)) 148	221)) 234	254)) 259
„ + Mg ...	17	102)	157)	259)	268)
PK ...	40	77)) 77	127)) 118	199)) 199	243)) 240
„ + Mg ...	19	76)	100)	200)	232)
P ...	37	82)) 86	153)) 161	243)) 240	256)) 246
„ + Mg ...	17	93)	128)	234)	220)
Control ...	53	90	177	167	181
Mean of all Plots ...		88.5	151.1	209.6	231.3

ESTATE B. Organic Soil. Palms Planted 1918.

	No. of Mature	1930		1931		1932
		Block I	Block II (6 Months only)	Block I	Block II	Block I and II
NPK	27	118	41	209	127)) 167	230)) 235
„ + Mg	17	160	51	146	143)	244)
PK	27	99	13	210	86)) 186	211)) 221
„ + Mg	14	122	47	277	149)	221)
P	25	66	42	222	255)) 222	230)) 232
„ + Mg	19	53	46	200	210)	236)
Control	48	90	45	110	92 99	113
Mean of all Plots					168.5	200.3

* Figures are given to the nearest unit for clarity. For analysis, approximation to the first place of decimals was employed.

Table F.

Yields Expressed as Percentages of General Means.

SERDANG.

	1929	1930	1931	1932
NPK ...	100.5	75.3	92.3	104.4
PK ...	95.4	98.5	122.2	109.6
P ...	107.7	91.2	93.8	90.9
Control ...	96.4	87.6	81.4	95.1
Increase over control required for significance ...	27	44	82	per cent. 74
Difference between any two treatments required for significance...	35	57	105	97

ESTATE A.

	1929	1930	1931	1932
NPK ...	113.6	98.2	11.4	111.9
PK ...	87.4	77.8	95.0	103.7
P ...	97.2	106.8	114.4	106.3
Control ...	101.9	117.4	79.2	78.4
Increase over control required for significance ...		29.	18	per cent. 19
Difference between any two treatments required for significance...		35	22	24

ESTATE B.

	1931	1932
NPK ...	99.1	117.3
PK ...	110.4	110.3
P ...	131.8	115.8
Control ...	58.8	56.4
Increase over control required for significance ...	24	per cent. 14
Difference between any two treatments required for significance ...	30	17

THE OIL CONTENT OF MALAYAN GROUNDNUTS.

BY
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Introductory.

As a result of the recently imposed duties on all oils and fats for edible purposes, attention has been drawn to the possibilities of extending the cultivation of groundnuts with the object of encouraging a local industry for the production of the oil.

Large quantities of both groundnuts and groundnut oil are imported annually into Malaya, the bulk of these commodities being retained for local consumption.

The trade returns for these products for the years 1931 and 1932 were as follows :—

Year	Groundnuts		Groundnut oil	
	Net Imports	Value	Net Imports	Value
	Tons	$	Tons	$
1931	6,781	677,219	13,291	2,967,789
1932	6,700	723,306	9,265	2,195,486

In this connection it is of interest to note that in the case of the 1931 imports more than 90 per cent. of the groundnuts were imported from Java, while in the case of the oil, 85 per cent. originated from China and 14 per cent. from Java. The details of countries of origin for 1932 imports are not yet available.

The figures for the trade returns show therefore that there should be little difficulty in disposing of the crop locally, either as kernels for edible purposes or for expression of oil. As is well-known, groundnut oil is used almost exclusively by the Chinese community as a cooking oil, while the cake remaining after expression of the oil constitutes a valuable feeding stuff and should find a ready market.

As regards the utilisation of the crop for oil expression, however, statements have been made that the local nut compares unfavourably with the imported nut in oil content, the recovery of oil being stated to be as much as 5 per cent. greater in some cases for the imported compared with the local nut.

In view therefore of the possibilities of the crop, especially for cultivation by the small-holder, a series of analyses of nuts from different sources has been carried out in order to ascertain the extent of the variation in the oil content.

Collection and Analysis of Samples.

When discussing the oil content of groundnuts a distinction must be drawn between the undecorticated, or whole, nuts and the kernels. The latter are also referred to as decorticated nuts.

Since, however, groundnuts imported into Malaya are invariably decorticated, thereby saving freight charges, the comparative analyses were confined to the decorticated nuts or kernels proper.

It will be realised that when comparing the oil contents of kernels from different sources the figures must all be calculated to the same moisture content, and in this instance the moisture-free basis has been chosen. Although such a basis is theoretical, since the kernels, even though dried to constant air-dry weight, still contain a small percentage of moisture, a moisture-free basis is the most convenient to adopt for purposes of comparison.

Four samples of locally cultivated nuts were obtained from different parts of the country, also a similar number of samples of imported kernels. As regards the latter, three originated from Java, the remaining one from Coromandel, South India. As is well-known there are large exports of groundnuts from India to the European markets.

In addition to the oil content, determinations were also made of the average size of kernel in order to ascertain the difference existing between the local and imported varieties in this respect.

Results of Analysis.

The results of analysis of the various samples which are shown in Table I, indicate that while the Java kernel is larger in size than the local kernel, the figures for all the oil contents fall within the same range. There is no marked difference in favour of the Java kernel in respect of oil content, in fact the figures are slightly lower than those for the local kernels.

In this connection it is interesting to note that the sample of Coromandel kernels, although smaller in size than the average of either those imported from Java or cultivated locally, is richest in oil content.

General Considerations on Expression of Groundnut Oil.

Although the above figures indicate that the oil contents of both local and imported kernels are of the same order, when calculated on a moisture-free basis, it is possible that in some cases a better recovery of oil is obtained when pressing the imported kernels on account of their lower moisture content. This is due to the necessity of adequate drying before shipment in order to prevent development of mould with consequent reduction of oil content and deterioration in quality of oil.

Results of analysis show that the moisture content of freshly harvested groundnut kernels may be as high as 42 per cent. and, although the kernels can

be shelled without being damaged when the moisture content is still 20 to 25 per cent., it will be be realised that the latter figures are considerably in excess of those quoted in the table.

Further, it is well known that when pressing groundnuts there is a tendency for the material to spue owing to the soft texture of the kernel. This tendency, which is especially noticeable when pressing the meal cold for the recovery of the first quality oil, would become more marked if fresh kernels, which had been insufficiently dried, were treated. In order to overcome spueing, and to ensure the expression of a clear oil, a small proportion of the husk is sometimes incorporated with the kernels during grinding, the fragments of husk acting as a binding material to the soft meal.

Also, it will be found that when the meal has a tendency to spue, in addition to the loss of oil entailed by an increased amount of sludge, the meal also tends to retain an increased amount of oil, so that the actual recovery of oil is diminished owing to both causes.

It will be realised therefore that the moisture content of the kernel is important from the point of view both of satisfactory expression of oil and of recovery of oil. As regards the latter point, the figures in the following table showing the progressive decrease of oil content with increase of moisture content may be of interest.

Moisture per cent.	Oil per cent.
Nil	50.0
4	48.0
8	46.0
12	44.0
16	42.0
20	40.0

Assuming an average of 50 per cent. of oil for the moisture-free kernel, it will be seen that there is a decrease of 2 per cent. in the oil content for an increase of 4 per cent. in the moisture content.

Unless therefore the kernels are adequately dried before expression, a diminished oil recovery, compared with imported kernels, will result.

Owing to the protection offered by the shell to the soft moist kernel, the nuts when first harvested should be dried in the shell. Drying should continue until the nuts cease to lose weight, after which the nuts should be shelled, the kernels being further dried for a few days to ensure that the process is complete.

Oil Content of Whole Nuts.

Although no comparison could be made of the proportion of shell to kernel in the case of the imported nuts it may be of interest to record the figures for the local produce, since in those cases whole nuts were received for analysis.

The results, which are shown in Table II, are based on the samples as received, the figures for the oil content being abstracted from the previous table.

TABLE I.

Variations in Size and Oil Content of Groundnut Kernels.

	Local				Java			Indian
	Sample No. 1	Sample No. 2	Sample No. 3	Sample No. 4	Sample No. 1	Sample No. 2	Sample No. 3	
Average weight of kernel ...	0.31 gms.	0.46 gms.	0.50 gms.	0.58 gms.	0.70 gms.	0.70 gms.	0.51 gms.	0.40 gms.
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
Moisture (loss at 100°C) ...	7.4	8.0	5.9	6.5	7.6	7.1	6.4	6.2
Oil (petroleum ether extract)	47.5	46.1	45.4	47.3	45.2	46.3	46.3	48.8
Residue (by difference) ...	45.1	45.9	48.7	46.2	47.2	46.6	47.3	45.0
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Oil (on moisture-free basis)	51.3	50.1	48.3	50.6	48.9	49.9	49.5	52.0

TABLE II.

Results of Analysis of Local Groundnuts.

	Sample No. 1	Sample No. 2	Sample No. 3.	Sample No. 4
	per cent.	per cent.	per cent.	per cent.
Proportion of shell ...	35.0	32.5	27.0	24.5
Proportion of kernel ...	65.0	67.5	73.0	75.5
	100.0	100.0	100.0	100.0
Oil content of kernel ...	47.5	46.1	45.4	47.3
Oil content of nut ...	30.9	31.1	33.1	35.8

The results indicate therefore that the proportion of kernel to whole nut varies from approximately 65 to 75 per cent., the oil content of the nut from approximately 31 to 36 per cent.

Wide variations are to be expected in the case of the nut owing to the variation in development of kernel, the latter being dependent on other factors, for example, soil and cultural conditions, and freedom of the plant from pests and diseases.

Conclusions.

The results indicate that, although the imported groundnut kernel is larger than the local kernel, the increased size cannot be correlated with a higher oil content.

The oil content figure, calculated on a moisture-free basis, approximates to 50 per cent., which corresponds to approximately 46.5 per cent. on a 7 per cent. moisture basis. The latter figure would appear to represent the average moisture content of air-dry kernels.

It is possible that the lower oil recovery found in some cases for locally grown nuts is due to insufficient drying.

THE VILLAGE FAIR.

A Co-operative Experiment.

BY

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The village fair as a means of exchanging the surplus produce of agriculturists has existed from the dawn of history. It is found in almost every country of the world in some form or other. In Malaya under the name of "pekan sa-hari" (one-day market) it has been found in a simple form in many parts of the country. During the past fifteen years or so, the rapid spread of rubber growing amongst Malay small-holders has tended to destroy the village fairs in many parts of the country. The large profits which resulted from rubber growing, discouraged the small-holder from planting food crops which normally form the basis of a village fair. It was easier and more profitable to concentrate on rubber, and, from the proceeds, purchase the foodstuffs required from Chinese market-gardeners and from the village shop. The catastrophic fall in the price of rubber — probably the biggest percentage decline in the price of any primary commodity (1925: 32d. per lb., 1932: 2d. per lb.) — has demonstrated the danger of the peasantry, and incidentally the revenue of the country, being dependent upon the price of a commodity subject to such wild fluctuations. During the past year, as a result of economic pressure and strenuous propaganda by the Government Departments concerned, there has been a growing tendency for Malay small-holders to grow food crops for their own consumption. This has been done partly by the alienation of new areas, including Government Reserves on a temporary occupation licence, and partly by cutting down small areas of rubber in those districts where no State land was available. A special cinema film, entitled "Food First", stressing the desirability of each small-holder growing sufficient food-stuffs for his own use, has been prepared by the Co-operative Societies Department and is being exhibited by the Rural Lecture Caravan which is maintained jointly by the Agricultural Department, the Rubber Research Institute and the Co-operative Societies Department.

This increased growing of foodstuffs has been largely responsible for the revival of village fairs in all parts of the country. Without some such medium of exchange, it would be difficult, if not impossible, for the peasant to obtain a fair price, or even any price at all, for his surplus produce. The fairs have started in a simple way. Generally speaking, the local Penghulu with the assistance and encouragement of the District Officer has persuaded his people to put up small stalls, made of jungle timber and roofed with attap, on a piece of waste land at some convenient centre. A day is fixed for the fair. Peasants bring in their surplus produce and gradually a simple trading centre has grown up.

In course of time, certain defects have revealed themselves. Fairs were often started without sufficient attention being paid to the suitability of the site as a marketing centre with the result that they have quickly died. Questions of supervision and cleanliness have arisen. In many places the fairs have been swamped by sellers of other nationalities, or by small-holders from other parts of the State, thus vitiating the main principle of the fair as a medium of disposing of the surplus produce of a particular place. It was felt that some simple form of organisation was desirable if the best results were to be obtained.

At the request of several District Officers, the Co-operative Societies Department has endeavoured to find a solution. It was decided to recommend that the fairs should be registered as Co-operative Societies, and simple by-laws were drawn up. There are certain obvious advantages in registering these organisations under the Co-operative Law. The fair becomes a recognised, registered body controlled by an elected Committee which is responsbile to the District Officer for its proper supervision, control and cleanliness. Membership of the fair is restricted to small-holders living in its area of operations. Outsiders are not prohibited from selling, but they are subject to such restrictions as the Committee of the fair may wish to impose.

The by-laws make provision whereby members can open simple deposit accounts with the fair, and bank a part of the proceeds of their sales. This money can be withdrawn as and when required, or can be accumulated for the payment of land rents. It is somewhat curious to note that, in some places, the idea of a deposit to assist the raiats to pay land rent is one of the features of the fair which makes a special appeal to them. When rubber stood at boom prices, it was generally possible for the small-holder to pay the whole of his year's rent from the proceeds of one sale of rubber. The position is of course different now. At present prices, it means that the money must be saved by putting aside a definite percentage of a number of sales. The raiat is not used to the idea and finds considerable difficulty in adjusting his habits of life accordingly.

Land rent is the only direct taxation paid by the peasant, and a small-holder with an average holding should not find it difficult to pay it provided that he is capable of adjusting himself to the idea of collecting it in instalments. The deposit accounts in the co-operative fairs should be of considerable assistance to him in this direction.

The provision of simple banking facilities in an organisation of this sort should also tend towards a better appreciation of the use of money. Merely to increase the income of a peasant by means of better agriculture or better marketing of produce is not all that is required. The main criterion is what he does with the extra money which has come to him. There is no gain in helping a man to make an additional $2 at a weekly fair, if the extra amount obtained is to be immediately frittered away in the local coffee shop or if he is to idle about, doing no work, until it is all spent.

Another advantage of regulating a fair as a co-operative society is that it should tend to inculcate a corporate spirit amongst its members. One of the great difficulties in starting more advanced types of co-operative societies such as Credit Societies, Marketing Societies, Village Shops, etc., is that the idea of working together, at any rate under modern conditions, is a novel one. Mutual suspicions have to be overcome before mutual trust and understanding can be established. The successful operation of a simple form of co-operation like a fair, should give the members the confidence and courage to attempt more advanced forms of co-operative enterprise.

Review.

Transport of Mangosteens by Sea. (ii)

Report on Further Experimental Consignments of Mangosteens from Burma 1932. Empire Marketing Board Report.

This report records the results of two further experimental consignments of mangosteens shipped from Burma to the United Kingdom. Previous consignments had been forwarded in 1929, 1930 and 1931.*

The first shipment in the present consignment consisted of 1000 fruits packed in 40 wooden trays; 500 had been picked when just ripening and 500 when almost ripe. The fruits were shipped on April 14th and arrived at Tilbury on May 13th. The temperature of carriage did not rise above 52°F. or fall below 38°F. during the voyage.

A small consignment of canned fruit was sent with each shipment for a report on the quality and suitability for market. Examination of a sample of the fruits showed that 12 per cent. of waste was present, and, in the green fruits, the flesh was hard and adhering to the rind, under-ripe and rather unpalatable. The almost ripe, sound fruit was dark-red in colour and attractive in appearance and the flesh was juicy and of good flavour. All the fruits had a hard rind.

The report states that "although carried in cool storage both the almost ripe and the just ripening fruit contained a high proportion of wastage due to fungal rotting".

The second shipment was despatched on May 7th and arrived at Tilbury on June 8th. The highest and lowest temperatures recorded during the voyage were 54°F. and 48°F.

The second consignment appeared to be in somewhat better condition than the first. "Nevertheless many fruits showed evidence of fungal infection, and samples retained at ordinary temperatures developed extensive wastage within a week".

The report states that in slightly rotted fruits infection by rotting organisms (*Diplodia* sp., *Pestalozzia* sp., *Glocosporium* sp., and *Rhizopus* sp.,) had started from the stem end. In very advanced rotting the whole of the fruit was involved and the rind was covered with a black mould growth. Sometimes the rind appeared to be sound while the interior of the fruit was completely rotted.

The report further states that "In view of the nature of the infection it is "evident that the majority of the wastage at the time of discharge was due to "infection while the fruit was on the tree. According to preshipment informa- "tion more than 25 per cent. of the fruit intended for canning was found to be "rotted.

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*Reviewed in *Malayan Agricultural Journal*, Vol. XX, No. 1. 1932 p. 31.

" It was mentioned in an earlier report that the growth of Diplodia, is retarded " by storage at temperatures below 55°F. Wastage in fruit infected by this " organism increases rapidly, however, when storage at high temperature is " resumed. The fact that within a week the wastage was well over 50 per cent. " indicates fairly conclusively that a very large proportion of the fruit was in- " fected at the time of picking..... The sale of such fruit naturally often " leads to disappointment on the part of the buyer with loss of confidence when " future purchases are contemplated. In view of this it is strongly recom- " mended that, before further shipments are made, steps should be taken to " ensure that fruit at the time of packing, is sound and free from infection by " orchard—rot organisms.

" It has been previously pointed out that this can probably only be achieved " by orchard sanitation, including spraying, pruning away and burning all dead " twigs and branches. .....it is strongly recommended that before further " shipments are sent, efforts should be made to eradicate the cause of wastage. " With regard to future demand, the opinions were similar to those obtained " in 1931. It was considered that the demand would be very limited and would " come mainly from large stores. The product was in the nature of a speciality " and would not appeal to the general public."

With the last statement the Reviewer is in entire agreement. The mangosteen, sold in Europe at an economic price which would repay the exporter, is hardly likely to be greatly in demand, even if wastage could be reduced to a minimum and the fruits retailed in a sound condition.

With regard to the measures suggested, to reduce the amount of infection by rotting organisms, the Reviewer is of the opinion that such measures are impracticable at least so far as Malaya is concerned. Mangosteens in this country are usually interplanted with other types of trees and it would be a costly and somewhat useless measure to spray the trees with the object of reducing the amount of infection by the organisms found in the fruits on arrival in England. The spores of these organisms are everywhere present, and, even if fruits were picked from a treated orchard, they would undoubtedly be found to be infected with spores of these organisms on the surface of the fruit. The Reviewer's experience has been that any fruit picked fresh, and apparently free from any form of rot, if placed in a sterilised container at room temperature will, in Malaya, develop signs of various mould growths at the stalk end in the space of 24 hours. Protection of the cut stalk immediately on picking, and surface sterilisation of the fruit prior to packing and storage at a suitable temperature, would seem to be methods more liable to reduce rotting in transit, than any methods of orchard sanitation, however desirable the latter may be as ordinary agricultural practice.

The trade opinions on the samples of canned fruits examined, indicate that the fruit was somewhat unattractive in appearance and insipid in flavour and that the mangosteen does not lend itself to canning, as it possesses a delicate flavour which is either masked or destroyed by the process.

It would appear from these reports that the prospects of developing a trade in the shipment of mangosteens from the East to England are not too bright. The laudable efforts of the Department of Agriculture in Burma, in this direction, are to be commended, and the results of future work will be awaited with interest. As far as Malaya is concerned, however, it is unlikely that the shipment of mangosteens to Europe, as a commercial proposition, will at present be given serious consideration.

A. T.

Miscellaneous Article.

CONDITIONS ON SMALL RUBBER HOLDINGS IN MALAYA.

First Quarter 1933.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S. in collaboration with the Field Branch of the Department of Agriculture.

Rainfall.

The rainfall in January approximated closely to the average for the month in most parts of the country, with the exceptions of the main range areas in Perak, the east coast of Pahang and a strip of the Selangor - Perak coast, where rainfall was above normal. In February, rainfall was generally below the average, droughts being experienced in the Malacca - North Johore region and in Pahang. In the inland regions of the Peninsula precipitation was below normal during March. In Selangor - Negri Sembilan and on the east coast, the rainfall was average, while in the west coast region from Malacca to Singapore the weather was abnormally wet.

Prices.

Table I in this article shows the range of prices for small-holder's rubber among local dealers, together with the average monthly Singapore price for standard sheet and the prices quoted at the end of the month by large dealers. The figures of local dealers' prices were obtained from a large number of purchasing centres where many factors such as transport and competition affect the price paid to the producer.

Tapping.

Heavy "wintering" of trees with a consequent reduction in yield, together with the absorbtion of labour in the work of harvesting padi led to an increase in the areas untapped during the quarter, in most parts of the country.

In Kedah, Selangor and Johore, however, tapping was reported to have been increasingly heavy during the "wintering" period in areas where small-holders were dependant upon rubber alone, in order to counter-balance the normal reduction in yield; tapping before dawn was observed to be carried out in parts of Perak and Province Wellesley with the same object.

Bark Consumption Investigations:—The work of compilation of figures obtained in connection with these investigations is nearing completion. On only 75 out of the total 90 holdings under observation for a period of a year, was tapping carried out over twelve consecutive months. Computation has already shown that on the above 75 holdings the rate of bark renewal is considerably in excess of the rate of bark excision. It is intended to publish the results of these investigations in the form of a special bulletin as soon as the work is completed.

Postponement or acceleration of bringing young rubber into tapping:—The only report of young rubber newly tapped is that from the Negri Sembilan, where an area of 333 acres was brought into tapping in the Kuala Pilah District.

Areas out of Tapping on Small Holdings.

The method of computing areas of tappable rubber which are untapped, which was described in the report for the fourth quarter of 1932, was again employed during the period under review. That is to say, counts were made of holdings tapped and untapped along the sides of main roads throughout all the larger areas of small holdings in the F.M.S., additional figures being obtained for the first time from Penang, Province Wellesley and Singapore, observations being also taken on a larger scale than before in Malacca. The resultant figures of the percentage untapped are applied to the known area under small holding rubber in each locality.

Since these counts were only made on one occasion in each District towards the end of the quarter, they cannot be taken as being anything more than a rough indication of the general position among small-holdings.

Table II shows the results of the above method of computation.

It will be seen that the total area untapped in March 1933 in the F.M.S. amounted to 133,000 acres or 26 per cent. of the total tappable area, as compared with 79,000 acres or 15.5 per cent. in December 1932, an increase of 54,000 acres or 41 per cent. The total area untapped in the S.S. amounted to 49,000 acres or 40 per cent. of the total tappable area.

Diseases

Mouldy rot.—The coincidence of the "wintering" of the trees with a period of dry weather had very considerable effect in checking the growth of mouldy-rot in all infected areas.

Oidium Heveae:—Following the wintering period, the dry conditions prevailing were favourable to the incidence of this disease. It was reported to have been found on estates and small-holdings in the Muar, Batu Pahat and Tangkah Districts of Johore, throughout all Districts of Malacca, and also between the main range and the coast of the Negri Sembilan, where, towards the end of March, its spread was rapid. There were a few mild cases of *Oidium* in Province Wellesley.

Root Diseases:—The general position as regards root diseases remains unchanged, isolated cases alone being observed among small holdings.

Grades of Rubber Made.

Figures for the comparative production of grades of rubber, where these have been recorded are as follows:—

Selangor (nine dealers in Ulu Selangor District only) smoked sheet 91 per cent., scrap and lump 9 per cent.

Penang and Province Wellesley (figures from 22 dealers in all Districts) smoked sheet 12 per cent., unsmoked sheet 69 per cent. and scrap 19 per cent.

Malacca, (figures from 26 dealers in all Districts) smoked sheet 30 per cent., unsmoked sheet 54 per cent. and scrap 16 per cent.

Perak, Krian District, smoked sheet 40 per cent., unsmoked sheet 47 per cent., scrap and slab 13 per cent. Taiping District, smoked sheet nil, unsmoked sheet 75 per cent., scrap 21 per cent. and slab 4 per cent. Tapah District, smoked sheet 7 per cent., unsmoked sheet 82 per cent. and scrap 11 per cent. Kuala Kangsar District, smoked sheet 44 per cent., unsmoked sheet 34 per cent. and scrap 22 per cent.

Tendency to Abandon Rubber Cultivation for Alternatives.

An area of 30 acres of rubber was cut down in Johore Bahru to allow for the planting of pineapples. Only a few cases have been observed of the destruction of a small number of trees to make room for the planting of fruit or vegetables in other localities.

Table I.

Rubber Prices (in Straits dollars per picul i.e. 133⅓ lbs.)

1st Quarter 1933.

	Singapore standard sheet Average	Singapore for small holder's rubber at end of month	Penang for small holder's rubber	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Province Wellesley	Kedah	Johore
						JANUARY					
Smoked sheet.	9	8	—	6-8	4-8.50	6-8.50	5.50-8.20	7-9	6.90-8	6-9	5.30-7.50
Unsmoked sheet.		7	6.20-7	4-6.50	3-7.50	4-7.50	4-7	6-8	4-7	4-7.50	3 80-6.50
Scrap		3.20	2-3.50	1-3	2-3.50	1-3	1-2.50	2.50-4.50	1.20-3.50	1.50-3.25	1-3
						FEBRUARY					
Smoked sheet	8.33	7.60	—	6.40-8	5-8	5.80-7.50	5-7.50	7-7.75	7-7.60	5.90-9.50	4-7.20
Unsmoked sheet		6.80	6.10-6.70	4-6.80	3.50-6-50	3.50-6	4-6	4.50-6.50	4-6.50	4.90-8	4.20-6.60
Scrap		2.80	2-2.60	1-2.50	1.50-2.50	1-3	1-3	80-3 50	1.20-4	2-3.25	1-2.50
						MARCH					
Smoked sheet.	8.04	7.60	—	6-8	5.50-7.50	5-7.60	5-7.40	6-7.75	7-7.50	6 8.50	5.40-7.50
Unsmoked sheet.		6.80	6-6.80	4-6	5.50-6.80	4-6.90	4-6.40	4-7	5-6.70	5-7	4.50-6.50
Scrap		2.50	2.60-3	1-2.50	1.20-3.80	1-3.50	1-3	80-3.50	1.50-3	1.80-3.50	1-3

Table II

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres, during March 1933.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Tolat area untapped	Percentage
Batang Padang	36,015	13,326	37	Klang	18,449	5,535	30	Seremban	18,834	6,215	33	Raub	6,583	1,119	17
Kinta	33,886	6,099	18	Kuala Langat	29,108	4,306	15	Tampin	17,391	3,826	22	Kuala Lipis	15,147	6,816	45
Kuala Kangsar	42,665	7,253	17	Ulu Langat	38,425	6,916	18	Kuala Pilah	17,253	6,556	38	Bentong	13 005	5,722	44
Upper Perak	12,378	5,199	42	Ulu Selangor	29,272	6,147	21	Jelebu	6,248	562	9	Other Districts	29,498	11,504‡	39†
Larut & Selama	50,474	12,618	25	Kuala Lumpur	21,062			Port Dickson	9,995	3,698	37				
Krian	9,598	5,951	62	Kuala Selangor	8,870	5,986	20								
Lower Perak	46,412	7,890*	17*												
	231,428	58,336	25		145,186	28,950	20		69,721	20,857	30		64,233	25,168	39

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage		Total Tappable area	Total area untapped	Percentage
Central	17,687‡	9,728	55	North	3,202	1,921	60	Singapore	12,332	7,646	62
Alor Gajah	29,948	11,380	38	Central	6,967	1,393	20				
Jasin	24,682	5,430	22	South	7,813	1,641	21				
				Dindings	7,279	4,513	62				
				Penang	11,019	4,958	45				
	72,317	26,538	37		36,280	14,426	40		12,332	7,646	62

The percentage of areas out of tapping in December 1932, was as follows:—Perak 9, Selangor 16, the Negri Sembilan 27, and Pahang 23.

* Estimated from same percentage as shown in Kuala Kangsar District.

† Estimated from mean percentage for remainder of State.

‡ Tappable area estimated from the total area planted up to end of 1931, i.e. 17,732 acres.

Departmental.

FROM THE DISTRICTS.

The Weather.

Rainfall approximated to normal throughout the Peninsula, being heavy in the inland region, much less heavy as compared with last month generally on the East coast and comparatively low at Kota Bahru in Kelantan.

Thunderstorms were general inland, which probably partly accounts for local patchiness in precipitation as, for instance, at Kuala Kangsar in Perak, where the figures are much below the average, although many surrounding localities received a higher quota than the average for the month.

Remarks on Crops.

Rubber.—There was a slight upward tendency in the price offered for small-holder's rubber towards the end of the month as is reflected in the range of prices reported from all centres. The highest and lowest prices recorded in dollars and cents per pikul are; smoked sheet, $5 to $11.40; unsmoked sheet $4 to $8.50; scrap 80 cents to $3.55. The average Singapore price recorded for small-holder's rubber is; smoked sheet $7.80; unsmoked $6.80 and scrap $2.70 whilst the range of prices in Penang was, for unsmoked sheet $8.60 to $6.20 and for scrap $3.30 to $2.

An increase in the number of holdings being tapped as the result of the upward price tendency is reported from parts of Perak and Selangor.

There is an encouraging concensus of opinion in many reports that, notwithstanding the wet weather, Mouldy rot disease is not so much in prominence as might be expected under the circumstances. There is evidence of a general attempt at control of damage by periodic paintings. This does not imply that there are any real efforts to rid infected areas of the disease, but it does definitely indicate that serious bark injury is being largely guarded against.

Reference to undergrowth in rubber holdings is rather more stressed in the month's reports than usual, probably because the wet weather has induced fresh growth of the herbage existing amongst most Malay owned rubber. In most cases Chinese and Indian owned holdings are cleaner weeded than those owned by Malays.

Padi.—Harvesting having been for the most part completed last month there is little of interest to report under this heading. Estimates of yields are not sufficiently complete to provide any definite information on the subject but, speaking generally, the crop has been satisfactory throughout the country. In Pahang it is estimated that the total area under padi, including land temporarily leased, was 44,790 acres, an increase in area of approximately 10,000 acres as compared with last season.

Satisfactory progress is reported to have taken place in the irrigation scheme for Sungei Manik in Lower Perak and irrigation facilities are expected to be available for the coming season.

At the Bagan Serai Mill, the price for padi continues to be maintained at $1.60 a pikul which is equivalent to 6½ cents a gantang.

Coconuts and Copra.—The price of copra has fallen still further during the month.

This fact increases the difficulty of placing newly operating improved kilns on a business footing but, notwithstanding, profitable transactions are reported from several of the more satisfactory kiln groups.

In Selangor, the standard of manufacture at the Sabak Bernam kilns remains satisfactory and the same applies to the better managed kilns in Kuala Selangor. There is no improvement in the position at Klang where it is still difficult to obtain nuts for working the kiln. On the other hand, in the Kuala Langat District there is an increasing tendency for Malay growers to manufacture coconut oil, which is sold locally and produces higher profits than are obtained by the sale of copra.

In Province Wellesley, a sale of copra from the Sungei Acheh kiln made a small profit, and a fresh kiln, designed to take 1,000 nuts, is in course of erection in the Central District.

In the Bagan Datoh District of Perak, certain improvements have been effected in a recently constructed kiln and further progress has been made in the construction of another brick kiln, whilst arrangements have been made for the construction of one clay and one brick kiln at Rungkup and a clay kiln in Utan Melintang mukim. It is unfortunate that the first lot of copra prepared on the recently improved kiln first mentioned was unsatisfactory owing, apparently, to faulty methods of firing.

In Pahang, a kiln erected at Temerloh is ready to start operations and the matter of arranging for the sale of any copra produced is receiving attention.

Tobacco.—This crop again features more prominently in many reports indicating an increasing interest. About 50 acres were planted in the Baling District of Kedah. In Province Wellesley, nursery beds have been laid down by Chinese in many areas in the Central District as the result of an increase in the local price of the product.

Small areas were planted during the month in Perak and Selangor and interest in the crop is still maintained in Singapore.

The range of prices quoted per picul for cured leaf at different parts of the country are as follows, Kedah $14 to $28; Province Wellesley, 1st grade $45 to $52; 2nd grade $39 to $45; Selangor $25 to $42.

Agricultural Stations.

Seasonal planting activity in relation to the supplying of permanent crops and sowing of annual crops is recorded from most stations. The programme for Bukit Mertajam Station in Province Wellesley included the planting of a

fairly large collection of vegetables and preparations for planting tobacco. Improvement in the appearance of all crops is recorded at Selama and Kuala Kangsar Stations, although, at the latter, weeds are causing much difficulty. In the Negri Sembilan, a satisfactory lay-out and planting programme has been proposed for Rembau Station, and a lay-out for Kuala Pilah Station is being formulated. At Sungei Udang Station in Malacca, considerable progress has been made in terracing and levelling an area on the left of the entrance road and in filling in an old river bed. In Pahang, further planting has been done at the Kuala Lipis and Pekan Stations, and much clearing has been done at the Kuantan Station. At the Pineapple Station, Singapore, increased crops are being produced from the manurial and mulched plots and a green manure plot has been prepared for planting. A second planting of tobacco in the rotation block was completed. In Brunei, surveying and clearing have been carried out on the area chosen for the main Agricultural Station and fencing has begun.

An experiment designed to throw further light on soil fertility problems, peculiar to the tropics, has been formulated at headquarters which is to be laid down on most of the Agricultural Stations in the country.

Padi Stations and Test Plots.

Inter-season vegetable crops planted at Bukit Merah Station in Province Wellesley are making good growth. The bunding of Test Plots in Krian is in progress. At Talang in Perak, fencing was completed on an area set apart for rotation grazing experiments. Nurseries have been established on the Negri Sembilan and several of the Pahang Test Plots; planting is completed at Kuang Test Plot and nurseries are established at the Kajang Test Plot in Selangor. Elsewhere, the land is lying fallow and next year's planting programmes are under consideration. The results of last year's manurial experiments have been examined and a cultural and manurial experiment has been prepared for inclusion at all Padi Stations next season.

DEPARTMENTAL NOTES.

Visits of the Director of Agriculture.

The Director of Agriculture, Dr. H. A. Tempany, C.B.E., visited Malacca from April 1st to April 3rd. During his visit he addressed the Malacca Planters' Association on the subjects of the economics of the rubber and rice industries and the general agricultural outlook for Malaya, and discussed administrative questions with the Resident Councillor, the Agricultural Field Officer and certain members of the planting community. He also visited and inspected the Agricultural Station, Sungei Udang, the Rice Breeding Station, Pulau Gadong, and the new works in connection with the Bachang and Tanjong Minyak irrigation and drainage scheme for rice cultivation.

On April 13th the Director visited Fraser's Hill and inspected the Government Farm.

Meeting of the Inter-Departmental Propaganda and Marketing Committee.

At the close of a meeting of the above Committee which was held on April 11th, Dr. Tempany, on behalf of the Agricultural Department and Rubber Research Institute members of the Committee, expressed the regret felt at the impending departure of Mr. A. Cavendish, M.C.S., Director of Co-operation, and wished him good luck and happiness in his retirement.

Leave and Staff Changes.

Mr. F. de la Mare Norris has been granted full-pay leave, prior to retirement, of 2 months and 25 days, from April 28th to July 22nd.

Mr. J. Fairweather, Agricultural Officer, Johore North, has been appointed to act as Principal Agricultural Officer, Johore, from April 28th.

Mr. F. C. Cooke, Assistant Chemist for Copra Research, has been granted 7 months and 6 days full pay leave from April 29th to December 4th.

Mr. R. A. Altson, Assistant Mycologist, returned from leave on May 2nd.

RETIREMENT OF Mr. A. CAVENDISH, M.C.S., DIRECTOR OF CO-OPERATION.

The retirement of Mr. A. Cavendish, M.C.S., from the post of Director of Co-operation—removes a personality who has been associated closely with the work of Agricultural Department for many years past.

The Department of Co-operative Societies was founded in the year 1923, and Mr. Cavendish has discharged the functions of Director since its inception.

For the building up of the co-operative organisation in Malaya Mr. Cavendish has been largely responsible, and the Department remains as a monument to his work. It is an open secret that he refused, on more than one occasion, promotion to higher rank in the administrative service in order to ensure the continuity of the work he had started.

It is mainly in connection with rural co-operation that Mr. Cavendish's work came into contact with that of the Agricultural Department. It is essential for success to be achieved in this connection, and also in the cognate sphere of marketing peasant produce, that the closest touch should be maintained between the two Departments. This Mr. Cavendish always recognised, and it is a pleasure to recall the continuous and amicable association with him which existed throughout the writer's period of service in Malaya.

Mr. Cavendish served for some years as a member of the Agricultural Advisory Committee and of the Advisory Committee for the School of Agriculture; he was Chairman of the Film Propaganda Committee which administered the working of the Rural Lecture Caravan, operated by the Departments of Co-operation and Agriculture and the Rubber Research Institute.

Latterly he served as Chairman of the newly established Inter-departmental Propaganda and Marketing Committee which incorporated the Film Committee and extended its functions to the difficult question of marketing peasant produce.

He collaborated with the Department of Agriculture in a number of agricultural conferences, and took a leading part in organising the Inter-departmental Conference which met in August 1932.

His interest and keenness on all matters pertaining to agriculture was unfailing, and he combined with it a personality of rare charm.

He carries with him the best wishes of the staff of the Department of Agriculture for a long and happy period of retirement.

H. A. T.

Statistical.

MARKET PRICES

April 1933.

Rubber.—The highest spot price recorded in Singapore during April for smoked sheet equal to London Standard was 7 15/16 cents on 7th and 29th and the lowest price 6 cents on 4th and 5th. The average price for the month was 6.92 cents per lb. in Singapore, 2.34d. in London and 3.47 cents gold in New York, as compared with 6.09 cents, 2.03d. and 3.03 cents gold respectively in March.

Palm Oil.—The course of the English market during April, on a basis of 18 per cent. f.f.a., c.i.f. Liverpool was as follows:—2nd, £13.10.0 per ton; 9th, £14.5.0; 15th, £14.5.0; 23rd, £13.15.0; and £15 per ton for Sumatra oil in bulk on 30th. Prices in the U.S.A. landed weight in bulk c.i.f. New York/Philadelphia were 2.10 cents gold per lb. on 11th, 2.20 cents on 19th and 2.97 cents on 29th.

The price of palm kernels, Fair Average Malayan Quality c.i.f. landed weight on the Continent rose from 7 shillings and 10½d. per cwt. on 11th to 8 shillings and 3d. on 29th.

Copra.—Prices have declined and the market has been depressed. The highest Singapore price for sundried during April was $3.95 per picul on the 3rd of the month, the average price being $3.82 per picul as compared with $4.35 for March. The mixed quality averaged $3.56 as compared with $4.03 in March.

Coffee.—Prices at Singapore for Sourabaya coffee declined towards the end of the month, ranging from $22.50 to $26 as compared with $24.50 to $25.75 during March: the price within the range depending on quality.

Palembang coffee averaged $18.87 as compared with $19.80 in March.

Arecanuts.—Palembangs averaged $2.32 per picul and Bila Whole averaged $2.33 as compared with $2.16 and $2.45 respectively in March. The range of Singapore prices for other grades were:—Split $3 to $5; Red Whole $2.75 to $4; Sliced $5.75 to $8; Kelantans $3.50 to $4 per picul, the price within each range depending on quality.

Rice.—The following are the average wholesale prices per picul of rice in Singapore during March:—Siam No. 2 $3.40, Rangoon No. 1 $3.05, as compared with $3.41 and $3.26 per picul during January. The average retail market prices in cents per gantang of No. 2 Siam rice in March were:—Singapore 26, Penang 28, Malacca 27, as compared with 25, 28 and 27 cents respectively in January.

Gambier.—Block Gambier declined slightly during the month the average price being $4.44 per picul and Cube remained steady at $8 per picul.

Pineapples.—Demand has been dull: the average Singapore prices per case

in April were :—Cubes $2.99, Sliced Flat $2.89, Sliced Tall $3.11, as compared with $2.95, $2.80 and $3.04 respectively during March.

Tapioca.—There has been a further decline in prices towards the end of the month. Flake depreciated from $4.50 to $4 per picul towards the end of the month, and Pearl Seed from $5 to $4.75 the average price per picul of the latter being $4.93 as compared with $5.69 during March.

The price of Flake averaged $4.17 as compared with $5.69 in March and Pearl medium averaged $5.12 as compared with $6.12 in the previous month.

Sago.—Pearl small fair rose slightly, the average being $4.42 as compared with $4.13. Flour Sarawak Fair averaged $1.79 as compared with $1.90 in March.

Mace.—Prices, more or less nominal, are quoted at $62 per picul for Siouw and $40 for Amboina.

Similar prices have ruled for the past five months.

Nutmegs.—There has been no demand during the month. The average Singapore prices per picul for 110's were $19.50 and 80's $24.25 as compared with $20.50 and $24.50 per picul respectively during March.

Pepper.—Average Singapore prices during April were as follows :—Singapore Black averaged $13.62 per picul, Singapore White $20.94 and Muntok White $21.50, the corresponding prices for March being $15, $21.31 and $21.75 respectivley.

Cloves.—There has been no demand for cloves, nominal prices being quoted at $40 for Zanzibar and $45 per picul for Amboina.

The above prices are based on London and Singapore daily quotations for rubber; the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil quotations are kindly supplied by Messrs. Cumberbatch & Co., Ltd. and Messrs. Guthrie & Co. Ltd., Kuala Lumpur, and the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at 2s. 4d.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural products. Similar assistance is also offered by the Malayan Information Agency, 57, Charing Cross, London, S.W. 1.

GENERAL RICE SUMMARY.

March, 1933.

Malaya.—Gross foreign imports of rice (including stocks available for re-export) during March 1933, amounted to 47,720 tons (as compared with 47,189 tons in March 1932) of which 52 per cent. were consigned to Singapore, 21 per cent. to Penang, 9 per cent. to Malacca, 17 per cent. to the Federated Malay States and 1 per cent. to the Unfederated Malay States.

Of these imports, 56 per cent. were from Siam, 41 per cent. from Burma, 1 per cent. from Indo-China and 2 per cent. from other countries.

Total foreign exports of rice from Malaya in March 1933, were 16,424 tons (including 282 tons local production) as compared with 13,668 tons in March of the previous year.

Of these exports 89 per cent. were consigned to Netherlands India and 11 per cent. to other countries.

Net imports for the period January to March 1933, amounted to 98,448 tons as compared with 114,085 tons during the same period for 1932, a fall of 14 per cent.

India and Burma.—Total foreign exports of rice during February 1933, were 174,000 tons as compared with 68,000 tons in the previous month and 241,000 tons in February 1932, an increase of 155.9 per cent. in respect of the previous month and a decrease of 28 per cent. in respect of the same period in the previous year.

Japan.—The position from March 1 to the end of October 1933 is estimated as follows:—Supply (including stocks on March 1st and imports from Korea, Formosa and other countries) 7,332,000 tons, consumption 6,268,000 tons, exports, 28,000, balance available as November 1st, (the beginning of the new season) 1,036,000 tons.

Siam.—Exports from Bangkok (approximate) during March 1933, amounted to 162,422 tons as compared with 158,232 tons (actual) in March 1932, an increase of 2.6 per cent.

Netherlands India, Java and Madura.—At the end of February 1933, the area harvested amounted to 425,000 acres a decrease of 23,000 acres or 5 per cent. as compared with the corresponding period of 1932, the area damaged was 11,000 acres a decrease of 6,000 acres or 35 per cent. as compared with 1932, and additional plantings awaiting harvesting amounted to 7,019,000 acres an increase of 24,000 acres or 0.3 per cent. The total acreage at the end of February 1933, amounted to 7,455,000 acres of which 6,405,000 acres were wet padi and 1,050,000 acres dry padi, a decrease of 11,000 acres or 0.1 per cent. as compared with the same period in the preceding year.

Imports of rice into Java and Madura during the period January and February 1933, totalled 36,270 tons, a decrease of 12,675 tons or 26 per cent. as compared with the same period of 1932.

Imports of rice into the Outer Provinces during January amounted to 18,738 tons, a decrease of 3,347 tons or 15 per cent. as compared with the same period of 1932.

An ordinance was promulgated at Buitenzorg on 21st March, prohibiting the importation of rice into the customs area of Netherlands India for a period of four months. The Celebes and the East Coast Province of Sumatra alone being permitted to import rice sufficient to fulfil their requirements.

French Indo-China.—Entries of padi at the port of Cholon from January to March 1933, amounted to 326,000 (metric) tons, a decrease of 5,000 tons or 2 per cent. as compared with the same period of 1932.

Exports of rice from Saigon for the period January to March totalled 361,000 tons, an increase of 42,000 tons or 13 per cent. as compared with the corresponding period of 1932.

Ceylon.—Imports for the period January and February 1933, totalled 71,252 tons, a decrease of 17,798 tons or 20 per cent. on the imports for the same period of 1932.

Of these imports 18 per cent. were from British India, 76 per cent. from Burma and 6 per cent. from other countries.

Europe and America.—Quantities of rice shipped from the East were :—

(*a*) To Europe for the period January 1st to March 16th, 207,533 tons, an increase of 75,992 tons or 58 per cent. as compared with the same period of 1932. Of these shipments 42 per cent. were from Burma, 11 per cent. from Japan, 37 per cent. from Saigon, 9 per cent. from Siam and 1 per cent. from Bengal, as compared with 61 per cent. from Burma, nil from Japan, 30 per cent. from Saigon, 2 per cent. from Siam and 7 per cent. from Bengal in 1932.

(*b*) To the Levant, period January 1st to February 15th, 2,315 tons, a fall of 6,691 tons as compared with the same period of 1932.

(*c*) To America and the West Indies for the period January 1st to February 15th, 11,825 a decrease of 8,798 tons as compared with the same period of 1932.

MALAYA RUBBER STATISTICS

ACREAGES OF TAPPABLE RUBBER NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING MARCH, 1933.

STATE OR TERRITORY	Acreage of Tappable Rubber end 1932	ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING		Total (3) + (5)	Percentage of (7) to (2)
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FEDERATED MALAY STATES :—							
Perak	250,951	15,826	6.3	32,546	13.0	48,372	19.3
Selangor	308,379	19,255	6.2	38,482	12.5	57,737	18.7
Negri Sembilan	228,541	18,918	8.3	22,311	9.8	41,229	18.1
Pahang	38,141	9,365	24.6	4,275	11.2	13,640	35.8
Total F.M.S. ...	826,012	63,364	7.7	97,614	11.8	160,978	19.5
STRAITS SETTLEMENTS :—							
Province Wellesley	44,734	2,488	5.6	8,867	19.8	11,355	25.4
Dindings	6,969	404	5.8	960	13.8	1,364	19.6
Malacca	111,780	5,687	5.1	22,553	20.2	28,240	25.3
Penang Island	1,635	1,359	83.1	50	3.1	1,409	86.2
Singapore Island	28,269	13,465	47.6	3,914	13.8	17,379	61.4
Total S.S. ...	193,387	23,403	12.1	36,344	18.8	59,747	30.9
UNFEDERATED MALAY STATES :—							
Johore	325,747	41,237	12.7	33,062	10.1	74,299	22.8
Kedah (*a*)	114,551	9,304	8.1	8,202	7.2	17,506	15.3
Kelantan	21,175	10,281	48.5	1,352	6.4	11,633	54.9
Trengganu (*b*)	4,352	Nil	Nil	2,072	47.6	2,072	47.6
Perlis (*a*)	957	106	11.1	502	52.5	608	63.5
Total U.M.S. ...	466,782	60,928	13.0	45,190	9.7	106,118	22.7
TOTAL MALAYA ...	1,486,181	147,695	9.9	179,148	12.1	326,843	22.0

Notes :— (*a*) Registered companies only and are rendered quarterly.
(*b*) Registered companies only.

The above table together with a Summary, was prepared and published by the Statistics Department, S.S. and F.M.S. in April 1933.

MALAYAN AGRICULTURAL EXPORTS, MARCH, 1933.

PRODUCT.	Net Export in Tons.				
	Year 1932	Jan.-March 1932	Jan.-March 1933	March 1932	March 1933
Arecanuts ...	20,280	7,108	5,506	2,668	973
Coconuts, fresh ...	108,123†	22,977†	21,609†	9,760†	5,455†
Coconut oil ...	11,932	2,642	4,636	931	1,676
Copra ...	97,464	18,643	20,902	5,590	1,911
Gambier, all kinds ...	1,925	829	593	326	199
Palm kernels ...	1,248	265	353	95	154
Palm oil ...	7,892	1,444	1,102	623	540
Pineapples, canned ...	66,291	16,374	12,935	4,438	3,910
Rubber ...	417,137	105,071	99,304	29,896	31,917
Sago,—flour ...	10,267	3,762	1,481	734	112
„ —pearl ...	3,228	642	505	191	157
„ —raw ...	4,148*	1,049*	1,078*	471*	361*
Tapioca,—flake ...	9,028	2,178	3,055	852	1,141
„ —flour ...	392	95*	36	78*	328*
„ —pearl ...	19,977	4,672	3,465	2,076	1,047
Tuba root ...	165½	30	80	28	37

† hundreds in nubmer. * net imports.

AREAS OF TAPPABLE RUBBER OUT OF TAPPING IN NETHERLANDS INDIA AT END OF DECEMBER 1932.*

(On Estates only, excluding Native Rubber).

	A Totally Ceased.		B Partly Ceased.		Total A & B	
	Estates	Area in acres	Estates	Area in acres	Estates	Area in acres
Java and Madura ...	153	71,035	71	18,191	224	89,226
Outer Provinces ...	203	82,362	68	36,472	271	118,834
Netherlands India ...	356	153,397	139	54,663	495	208,060

The total area out of tapping for December amounts to 22 per cent. of the total tappable area at the end of December 1931.

* The above figures are obtained from the Economisch Weekblad dated 17th February 1933.

MALAYA RUBBER STATISTICS — TABLE I

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF MARCH, 1933 IN DRY TONS.

Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month		
	Ports	Dealers	Estates of 100 acres and over	during the month	January to March 1933	during the month	January to March 1933	during the month		January to March 1933		during the month		January to March 1933		Ports	Dealers	Estates of 100 acres and over
								Foreign	From Malay States Labuan	Foreign	From Malay States Labuan	Foreign	Local	Foreign	Local			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
MALAY STATES :—																		
Federated Malay States	...	12,594	13,123	9,880	32,381	7,441	21,853	Nil	Nil	Nil	Nil	14,364	5,823	41,179	18,148	...	11,855	10,969
Johore	...	2,662	3,493	3,336	10,085	3,924	11,882	Nil	2	Nil	7	1,036	6,599	2,909	19,285	...	2,544	3,238
Kedah	...	616	2,133	1,834	6,515	1,021	3,275	Nil	Nil	Nil	Nil	1,292	1,938	3,576	7,215	...	553	1,821
Perlis	...	28	18	6	24	4	27	Nil	Nil	Nil	Nil	Nil	20	Nil	60	...	24	12
Kelantan ...	...	81	172	118	404	446	839	Nil	Nil	Nil	Nil	60	468	190	1,045	...	145	144
Trengganu ...	...	55	50	106	262	52	130	Nil	Nil	Nil	Nil	Nil	158	Nil	392		55	50
Total Malay States	...	16,036	18,989	15,280	49,671	12,888	38,006	Nil	2	Nil	7	16,752	15,006	47,854	46,145	...	15,176	16,234
STRAITS SETTLEMENTS :-																		
Malacca ...	...	6,378	1,433	1,193	3,772			Nil		9		5,192		12,810		...	5,910	1,381
Province Wellesley	...	1,087	555	369	1,405			Nil		Nil						...	828	447
Dindings ...	...	28	97	92	284	1,948	5,739	Nil	15,030	Nil	46,234	6,588	Nil	20,942	Nil	...	30	107
Penang	1,414	4,489	8	1	4			481		1,477						842	4,524	8
Singapore ...	4,318	16,640	196	145	423			5,732		15,712		13,527		44,616		2,392	19,563	141
Total Straits Settlements	5,732	28,622	2,289	1,800	5,888	1,948	5,739	6,213	15,030	17,198	46,234	25,307	Nil	78,368	Nil	3,234	30,855	2,084
TOTAL MALAYA	5,732	44,658	21,278	17,080	55,559	14,836	43,745	6,213	15,032	17,198	46,241	42,059	15,006	126,222	46,145	3,234	46,031	18,318

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Total
20	21	22	23	24	25	26
DRY RUBBER	8,886	17,623	4,008	6,595	985	38,097
WET RUBBER	2,969	1,940	516	173	1,559	7,157
TOTAL ...	11,855	19,563	4,524	6,768	2,544	45,254

TABLE III
FOREIGN EXPORTS

PORTS	For month	January 1933
Singapore ...	22,736	71,899
Penang ...	10,984	32,018
Port Swettenham.	6,407	18,890
Malacca ...	1,932	3,415
MALAYA ...	42,059	126,222

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	January 1933
Malay States ... / Straits Settlements	36,539	108,234
MALAYA ...	36,539	108,234

Notes:—1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.

2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month, + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [19A] — [2] — [3] — [4] — [5] — [9] — [10]. For the Straits Settlements, Columns [7] and [8] represent purchases by dealers from local estates of less than 100 acres, reduced by 15% to terms of dry rubber.

3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15%; wet sheet, 25%; scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.

4. Domestic exports are estimated by deducting the average monthly dry weight of foreign imports over a period of 2 months from the gross foreign exports of the later month, the foreign exports of the Malay States being domestic production.

5. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S. and F.M.S., at Singapore on 22rd of April 1933.

METEOROLOGICAL SUMMARY, MALAYA, MARCH, 1933.

Locality	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine		
	Means of			Absolute Extremes									Number of days							
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet	Total		Most in a day Amt.	Precipitation .01 in or more	Precipitation, .05 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more	Total	Daily Mean	Per cent
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hr.	hr.	%
Railway Hill, Kuala Lumpur, Selangor ...	91.2	72.5	81.8	94	70	81	74	84.6	84.9	11.00	279.4	2.84	21	20	7	3		173.05	5.58	46
Bukit Jeram, Selangor ...	87.4	72.5	79.9	90	70	80	75	84.4	86.4	6.63	168.4	1.54	17	14	3			216.70	6.99	58
Sitiawan, Perak ...	90.3	73.0	81.7	94	69	79	76	85.0	85.4	3.86	98.1	2.51	9	8	5	1		208.30	6.72	55
Kroh, Perak ...	90.6	68.9	79.7	95	65	73	72	83.1	82.7	6.98	177.3	1.40	12	10		3		246.25	7.94	66
Temerloh, Pahang ...	88.8	72.2	80.5	94	69	75	74	85.3	85.3	8.36	212.3	2.14	13	12		2		200.05	6.45	53
Kuala Lipis, Pahang ...	89.5	71.9	80.7	94	69	74	75	84.0	84.0	3.57	90.7	1.08	17	8	1	16		194.90	6.29	52
Kuala Pahang, Pahang ...	86.0	75.0	80.5	88	72	79	79	85.5	85.0	9.91	251.7	2.63	14	13	1		1	244.10	7.87	65
Mount Faber, Singapore ...	87.7	72.9	80.3	92	68	77	76	80.8	81.5	10.97	268.6	2.01	20	19	4			178.00	5.74	47
Butterworth, Province Wellesley ...	88.6	74.1	81.3	91	71	77	78	85.6	85.4	7.44	189.0	2.77	11	9	1			256.75	8.25	69
Bukit China, Malacca ...	86.7	73.9	80.3	91	71	77	76	83.0	84.1	10.51	266.9	2.85	12	11	5			209.35	6.75	56
Kluang, Johore ...	87.6	71.9	79.7	93	70	79	75	80.7	81.2	12.90	327.7	4.22	20	18	7	6		166.75	5.38	44
Bukit Lalang, Mersing, Johore	84.3	72.6	78.5	88	69	79	78	80.3	80.2	11.69	296.9	6.40	11	11	1	1		222.10	7.16	59
Alor Star, Kedah ...	92.8	72.1	82.5	96	68	77	76	85.2	85.0	6.94	176.3	2.42	10	10	6			262.00	8.45	70
Kota Bahru, Kelantan ...	87.2	71.2	79.2	92	67	74	75	82.2	82.6	7.78	197.6	3.91	7	5	1			268.50	8.66	72
Kuala Trengganu, Trengganu	86.5	71.7	79.1	90	69	82	76	83.0	83.2	5.77	146.6	2.79	9	6		2		248.95	8.03	66
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft. Pahang ...	71.9	62.3	67.1	77	58	64	65	71.7	72.1	9.88	250.9	1.80	20	18		22		121.85	3.93	32
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	72.7	55.7	64.2	76	48	65	63	68.9	68.6	6.40	162.6	1.01	18	14	1	2		158.25	5.10	42
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	72.2	58.7	65.5	77	55	66	62			7.40	188.0	1.07	18	14		1		171.30	5.53	46

Compiled from Returns supplied by the Meteorological Branch, Malaya.